

REMARKS

Overview of the Office Action

Claims 1-7, 9, 17-25, 27, 36, and 37 have been rejected under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 7,126,918 (“Roberts”).

Claims 10-14, 16, 28-32, and 34 have been rejected under 35 U.S.C. §103(a) as unpatentable over Roberts in view of U.S. Patent Pub. No. 2004/0151197 (“Hui”).

Claims 15 and 33 have been rejected under 35 U.S.C. §103(a) as unpatentable over Roberts in view of Hui, and further in view of U.S. Patent Pub. No. 2003/0014180 (“Myr”).

Claim 35 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Roberts in view of U.S. Patent No. 6,643,256 (“Shimojo”).

Claims 8 and 26 have been found to contain allowable subject matter, and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 38 and 39 have been allowed.

Status of the claims

Claims 1 and 19 have been amended.

Claims 9, 13, 27, and 31 have been canceled.

Claims 38-39 have been allowed.

Claims 1-8, 10-12, 14-26, 28-30, and 32-39 remain pending.

Rejection of claims 1-7, 9, 17-25, 27, 36, and 37 under 35 U.S.C. §102(e)

The Office Action states that Roberts teaches all of Applicants’ recited elements.

Independent apparatus claim 1 has now been amended to recite a device for processing packets of flows on a network link that includes “scheduling means for scheduling packets of flows in a queue in accordance with a fair queuing with priority algorithm, the scheduling means being configured to schedule as priority packets any packets of flows in the queue that are not identified in a list of active flows and as non-priority packets any packets of flows that are already identified in the list of active flows; and means for writing flows in and erasing flows from the list of active flows as a function of the arrival and departure of packets of the flows, said means being configured to erase from the list of active flows a flow which has not had any packets in the queue for a certain time period, thereby giving priority to the next packet of said flow”. Support for the claim amendments can be found in original claims 9 and 13 and in paragraph [0061] of Applicants' published specification.

Thus, according to Applicants' recited invention, the suppression of a non-active flow (i.e. a flow with a bit rate that remains below the dynamic threshold (“fair bit rate”)) from the list of active flows ensures that the next packet of this deleted flow will be handled with priority. More particularly, only the very next packet of this deleted flow will be handled with priority; after this next packet has been handled, the deleted flow is again made active (i.e., included in the list of active flows). A low rate flow will be removed from the list of active flows again before the next packet arrives (see paragraph [0134] of Applicants' specification).

Roberts fails to teach or suggest “the scheduling means being configured to schedule as priority packets any packets of flows in the queue that are not identified in a list of active flows and as non-priority packets any packets of flows that are already identified in the list of active flows”, and “said means being configured to erase from the list of active flows a flow which has

not had any packets in the queue for a certain time period, thereby giving priority to the next packet of said flow”, as recited in Applicants’ amended independent claim 1.

Roberts discloses a method of microflow management. According to Roberts, network 200 relies upon per flow state information including QoS and routing information that allows the network 200 to route IP data packets within specific QoS constraints over the network 200 for a specific group of data packets (e.g., micro-flow A) between a source (e.g., computer system 110A) and a destination (e.g., computer system 110F).

In particular, based upon the per flow state-based QoS information, the network 200 of Roberts is able to attain efficient signaling (routing) and queuing for each micro-flow, thereby ensuring that certain QoS guarantees, such as guaranteed rate ("GR") and guaranteed maximum delay variation ("DV") can be maintained. Such QoS guarantees are possible because each switch 220 in the network 200 of Roberts can monitor available bandwidth on the trunks coupled to each switch 220 and thereby manage each micro-flow on an individual basis to ensure that each micro-flow is routed in a manner that ensures the desired QoS constraints are satisfied (see col. 6, line 54 to col. 7 line 4 of Roberts).

Roberts discloses a flow block table 570 that includes a plurality of flow blocks, each of which include state-based QoS descriptors corresponding to a unique micro-flow. Roberts further discloses determining whether a flow block already exists for a received packet by searching the flow block table 570 (see col. 12, line 64 - col. 13, line 2 of Roberts). Packets not belonging to an existing flow in the flow block table 570 of Roberts are scheduled by constructing a new flow block in flow block table 570 (see col. 13, lines 3-16 of Roberts).

Although the content of the flow block table 570 of Roberts can be dynamically adjusted, the flow block table 570 disclosed by Roberts is not equivalent to the list of active flows recited

in Applicants' amended claim 1.

Specifically, the level of priority at which the micro-flows of Roberts are handled depends directly on the QoS descriptors and path information retrieved from the corresponding flow block (see col. 13, lines 1-11 of Roberts). The priority at which the micro-flows of Roberts are handled does not depend on whether the flow is identified in a list of active flows, as recited in Applicants' claim 1. In other words, the priority at which the micro-flows of Roberts are handled does not depend on whether the flow is identified in the flow block table 570.

Roberts teaches that a micro-flow can be added to the flow block table 570 (see col. 13, lines 13-15 of Roberts). However, Roberts does not teach or suggest that the added micro-flow is an active flow whose packets should be considered as non-priority packets for scheduling purposes, in contrast to the recitation of Applicants' claim 1.

The flow block table 570 of Roberts lists all micro-flows that should be taken into account for the scheduling operation, regardless of whether the packets of the flows are considered as priority or non-priority packets (see col. 12, lines 64-67 and col. 13, lines 3-11 of Roberts). Thus, the fact that a micro-flow is identified in the flow block table 570 of Roberts is not a criterion for deciding whether or not the packets of the micro-flow should be handled with priority, once again in contrast to the subject matter recited in Applicants' claim 1.

Roberts accordingly fails to teach or suggest "the scheduling means being configured to schedule as priority packets any packets of flows in the queue that are not identified in a list of active flows and as non-priority packets any packets of flows that are already identified in the list of active flows".

Roberts further teaches that a flow can be deleted from the flow block table 570 and therefore terminated after a certain period of time (according to the micro-flow timeout period

DT) (see col. 8, lines 28-30 and col. 9, line 63-col. 10, line 13 of Roberts). The termination of the flow of Roberts means that the flow is no longer included in the scheduling process.

Consequently, in order to be able to process any subsequent packet from that terminated flow, the system of Roberts requires either a new signaling procedure or a determination, from the content of the packet of the terminated flow, of a QoS profile to be applied (see col. 13, line 12 - col. 14, line 13 of Roberts).

In contrast to Roberts, the invention recited in Applicants' claim 1 includes removing from the list of active flows any flow that is not active (i.e. a flow with a bit rate that is below the dynamic threshold) to ensure that the next packet of that flow will be handled with priority, without however terminating the flow. In other words, according to Applicants' invention, the removal of a flow from the list of active flows does not result in the flow being terminated, but instead results in the packets of the flow being temporarily assigned a higher priority since the corresponding bit rate is below the dynamic threshold.

Thus, by dynamically removing a flow from the list of active flows, Applicants' recited invention enables dynamic management of QoS of that flow, given that certain parts of the flow can be handled with priority for a certain time period (i.e. whenever the bit rate of this flow is below the dynamic threshold), without however terminating the flow. The flow will remain in the list of active flows and if, at a later time, the bit rate of this flow exceeds the dynamic threshold, the packets of the flow will then be considered as non-priority packets (i.e., a lower priority).

Clearly, the flow block table 570 disclosed by Roberts does not have the same functionality as the list of active flows recited in Applicants' amended claim 1.

For the reasons presented above, Roberts fails to teach or suggest “the scheduling means being configured to schedule as priority packets any packets of flows in the queue that are not identified in a list of active flows and as non-priority packets any packets of flows that are already identified in the list of active flows”, and “said means being configured to erase from the list of active flows a flow which has not had any packets in the queue for a certain time period, thereby giving priority to the next packet of said flow”, as recited in Applicants’ amended independent claim 1.

Independent method claim 19 has been correspondingly amended to recite limitations akin to those now present in claim 1 and is, therefore, also deemed to be patentable over Roberts for the reasons discussed above with respect to claim 1.

In view of the foregoing, Applicants submit that Roberts fails to teach or suggest the subject matter recited in amended independent claims 1 and 19. Accordingly, claims 1 and 19 are patentable over Roberts under 35 U.S.C. §102(e).

Dependent claims

Claims 9 and 27 have been canceled. Claims 2-7, 17-18, 20-25, 36, and 37, which depend from independent claims 1 and 19, incorporate all of the limitations of the respective independent claim and are, therefore, deemed to be patentably distinct over Roberts for at least those reasons discussed above with respect to independent claims 1 and 19.

Rejection of claims 10-14, 16, 28-32, and 34 under 35 U.S.C. §103(a)

The Office Action states that the combination of Roberts and Hui teaches all of the elements recited in these claims.

Roberts has been previously discussed, and does not teach or suggest the invention recited in Applicants' amended independent claims 1 and 19.

Because Roberts does not teach or suggest the subject matter recited in Applicants' amended independent claims 1 and 19, and because Hui does not teach or suggest any elements of independent claims 1 and 19 that Roberts is missing, the addition of Hui fails to remedy the above-described deficiencies of Roberts.

Claims 13 and 31 have been canceled. Claims 10-12, 14, 16, 28-30, 32, and 34, which depend from amended independent claims 1 and 19, incorporate all of the limitations of the respective independent claim and are, therefore, deemed to be patentably distinct over the combination of Roberts and Hui for at least those reasons discussed above with respect to independent claims 1 and 19.

Rejection of claims 15 and 33 under 35 U.S.C. §103(a)

The Office Action states that the combination of Roberts, Hui, and Myr teaches all of the elements recited in these claims.

Roberts has been previously discussed and does not teach or suggest the invention recited in Applicants' amended independent claims 1 and 19.

Because Roberts does not teach or suggest the subject matter recited in Applicants' amended independent claims 1 and 19, and because Hui and Myr do not teach or suggest any elements of independent claims 1 and 19 that Roberts is missing, the addition of Hui and Myr fails to remedy the above-described deficiencies of Roberts.

Claims 15 and 33, which depend from amended independent claims 1 and 19, incorporate all of the limitations of the respective independent claim and are, therefore, correspondingly

deemed to be patentably distinct over the combination of Roberts, Hui, and Myr for at least those reasons discussed above with respect to independent claims 1 and 19.

Rejection of claim 35 under 35 U.S.C. §103(a)

The Office Action states that the combination of Roberts and Shimojo teaches all of the elements recited in Applicants' claim 35.

Roberts has been previously discussed and does not teach or suggest the invention recited in Applicants' amended independent claim 19.

Because Roberts does not teach or suggest the subject matter recited in Applicants' amended independent claim 19, and because Shimojo does not teach or suggest any elements of independent claim 19 that Roberts is missing, the addition of Shimojo fails to remedy the above-described deficiencies of Roberts.

Claim 35, which depends from amended independent claim 19, incorporates all of the limitations of independent claim 19 and is, therefore, deemed to be patentably distinct over the combination of Roberts and Shimojo for at least those reasons discussed above with respect to independent claim 19.

Conclusion

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of all rejections, and allowance of all pending claims, in due course.

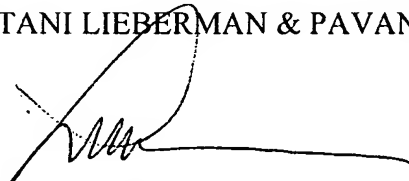
Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned to facilitate an early resolution of any outstanding issues.

It is believed that no additional fee or charge are required at this time in connection with the present application. However, if any fees or charges are required at this time in connection with the present application, it may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,

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